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A STUDY ON EFFECTS OF TRAFFIC NOISE POLLUTION IN DEORIA CITY

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ABSTRACT

This research work was done to evaluate noise exposure condition, for effects calculation and the computation of the equivalent noise levels and noise level indices i.e. (TNI and NPL) on the state highway (S.H-1 and S.H-79) which runs through Deoria city. Sound level was recorded at 12 various sampling stations. A little poll study performed on the overviewed range. For the poll study the interviewees were separated into five classifications. They are vehicle drivers (35), old age citizens (15), student (45), shopkeepers (25) and industrial workers (50) out of 170 interviewees. Noise level of sound was not reasonable from health danger perspective. From this research the entire situation was not good for human health. It was clear the greatest noise level was about 100 dB (A) coming from the running vehicles on the state highway S.H-1 and S.H-79. From the survey it was observed that public was not aware about the bad effects of the noise pollution, thus it was necessary for the people to make them aware about the bad effects of noise pollution on human health.

***Keywords*: Decibel, equivalent noise, Human Health, Noise Level, Permissible Sound.**

I. INTRODUCTION

The current decades have been observer to rise of ecological pollution as a considerable and huge worldwide issue [1]. Noise pollution is the arrangement of undesirable sounds (called noise) created by the business, machinery and hardware and spreading through the earth [2-3]. Most regular antagonistic impacts of noise pollution incorporate neurological and metabolic ailments, for example, rest issue, push, hypertension, crabbiness and cardiovascular maladies [4-7]. Ecological noise can be viewed as one of the operators of decay in individuals' personal satisfaction in an urban situation [8]. The World Health Organization (WHO) evaluates that Disability-Adjusted Life Years (DALYs) lost because of ecological noise are "6000 years for ischemic coronary illness, 45,000 years for subjective weakness of kids, 903,000 years for rest unsettling influence, and 21,000 years for tinnitus and 587,000 years for irritation" [9]. Different reviews have found a connection between the noise pollution delivered by street traffic and the expansion in circulatory strain and heart assaults in grown-ups and diminish in learning and remembrance ability of kids living inside 100 m of essential expressways with noise levels of higher than °0 dB [10]. A few reviews have revealed that the level of stress and touchiness increments with the expansion of noise pollution [11-12]. In a review

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on the city of Varanasi, it was found that noise level is high to the point that 85% of the general population is disturbed by traffic noise and around 90% of inhabitant's express noise as the fundamental driver of cerebral pain, hypertension, tipsiness and exhaustion [13]. This issue has additionally been worried by a few reviews [14].

The aim of this study is to assess the level of noise pollution on S.H-1 and S.H-79 passing via Deoria city and to compare it with national standards and to conduct a survey study for the calculation of the effects of the noise pollution on the people of Deoria city.

TABLE 1: Limits for Noise Level [15]

Area	Limits in dB (A)L_{eq}*	
	Day* time	Night** time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Silence zone	50	40

Source: CPCB.nic.in.

II. MATERIALS AND METHODS

This chapter explains how the noise assessment in Deoria city was conducted. In the present study, the noise levels have been recorded with the help of Precision Noise Level Meter of make 'Bruel and Kjaer, Denmark (2232)'. The data have been collected for overall 12 hours for noise measurement which includes day time for noise measurement on the respective days at the selected sites. The time interval of 8:00 a.m. to 8:00 p.m. was selected during day time. The time intervals are so selected as to cover most part of the day. As far as possible, measurements have been taken from at least 1.5 m above the ground level and at least 3.5 m from reflecting surfaces, at the concerned hours for 10 minute duration at fixed intervals of 15 seconds. So about 40 readings are taken using the formula for each observation hour.

A. Study area description

Deoria city is located in Eastern part of Uttar Pradesh and is connected by two State Highways i.e. S.H-1 and S.H-79. The location description of study area and the sampling stations are shown in the figure below [16].

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Source: googlemaps.in

Fig.1:- Location of sampling station

B. Sound estimation

Concept (equivalent noise level) is that statistical value of sound pressure level that can be equated to any fluctuating noise level. Thus, is defined as the constant noise level which over a given time expands the same amount of energy as is expanded by fluctuating levels over the same time, this value is expressed by the equation-

$$L_{eq}=10\ \mathrm{Log}_{10}\ {}_1 10^{li/10} * t_i \qquad \text{dB (A)}$$

Noise Pollution Level (NPL)

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D.W Robinson of the British National Physical Laboratory in 1969 expressed that L_{eq} in itself is a lacking descriptor of irritation brought about by fluctuating noise [17]. Since street activity noise is an essentially fluctuating noise, the list NPL was created to assess the disappointment brought about by street movement noise including two terms. The primary term is a measure of the identical persistent noise level (L_{eq}) and the second speaks to the expansion of disturbance brought about by changes in that level. For Gaussian dispersion of noise levels, NPL can be communicated as,

$$NPL = L_{eq} + (L_{10} - L_{90}) \qquad \text{dB (A)}$$

Where, L_{10}, L_{50} and L_{90} are the percentile of noise level exceeding 10%, 50% and 90% respectively.

Traffic Noise Index (TNI)

It is an activity noise rating record got from a mix of noise levels that gives a superior relationship with disappointment. It is gotten on the thought that L_{10} as pinnacle noise level barges in into foundation noise level L_{90} when A-weighted noise levels are measured outside. For Gaussian circulation of noise levels, TNI can be communicated as,

$$TNI = 4(L_{10} - L_{90}) + L_{90} - 30 \qquad \text{dB (A)}$$

C. Survey study

A little scale poll study is led on individuals of sampling point region. To play out this study the meetings are separated into five classifications, in particular Worker, students, Drivers, Shopkeeper and old citizens. They were asked a couple address and their answers were recorded in overview archives. The inquiries asked are:-

a. Do you feel irritated by the sound around you?
b. What is your academic qualification (i.e. are you educated or not) ?
c. Do you feel any physical aggravation because of noise?
d. Do you feel any mental aggravation because of noise?
e. Do you feel any health problem (such as blood pressure, heart problem, hearing problem e.t.c) because of noise?
f. Do you know such noise level can prompt deafness?
g. Do you recognize what can be done to control noise level?
h. Have you visited to the doctor?
i. Is noise bearable to you?

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III. RESULTS AND DISCUSSION

Noise calculation in the sampling area:-

TABLE 2:- Leq , Maximum Leq, acceptable limit, TNI and NPL

S.N.	Sampling stations	Leq dB(A)	Max. Leq dB(A)	Time (hour)	mit dB)	Difference b/w max. and limit	TNI B(A)	PL B(A)
1	Industrial area	68.7	96.8	09-10	75	21.8	74.56	79.69
2	Ganapati automobiles	68.3	87.2	09-10	65	22.2	81.3	80.81
3	Canara bank	72.6	85.5	10-11	65	20.5	85.83	86.02
4	Post office	69.98	83	18-19	65	18	84.63	83.12
5	Bus stand	67.88	83.9	18-19	65	18.9	84.45	81.56
6	Bhatwaliya crossing	66.67	82.4	16-17	65	17.4	83.19	81.13
7	Central academy	68.67	84.6	16-17	50	34.6	84.34	82.51
8	Deep automobiles	71.19	87.2	08-09	65	22.2	89.13	86.05
9	Sonu ghat	65.54	85.3	18-19	65	20.3	77.13	77.84
10	Motilal chowk	68.26	89.6	11-12	65	24.6	76.92	80
11	Peda gali	70.06	88.5	10-11	65	23.5	85.72	84.2
12	Gayatri mandir	65.81	84.3	08-09	55	29.3	87.9	81.25

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A.HEALTH IMPACTS IN STUDY AREA

The impacts of traffic noise on humans are now an alarming issue in medical facilities. Noise causes many problems to public health. This research work has been done to calculate the effects of noise pollution for public in Deoria city and to assess the present condition.

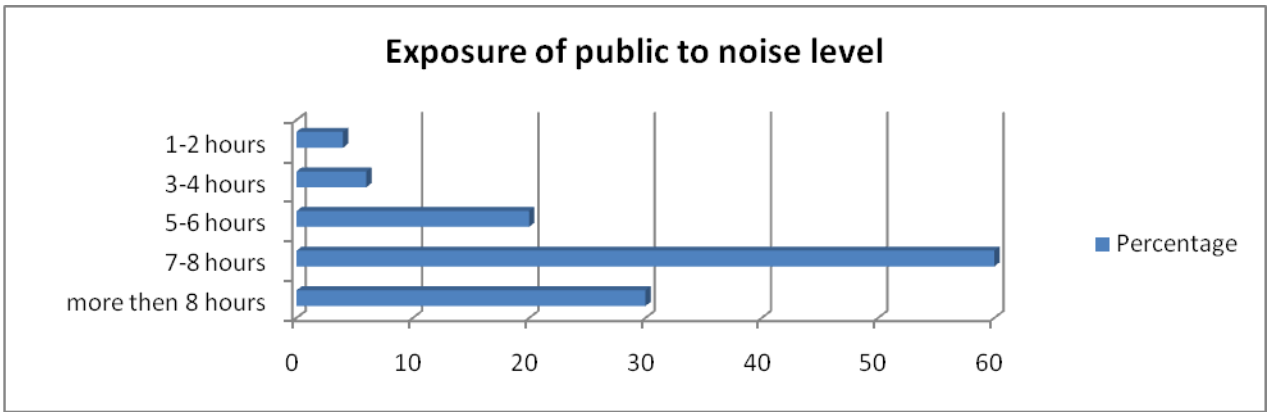

Fig. 2: Exposure of public to noise level.

Health problems caused by noise pollution mainly depends on noise level and time of exposure. In the above figure exposure time of noise is shown, which is related to public health issues, and it is at alarming level. The above graph shows that almost every resident in Deoria city is exposing to noise for at least 4-5 hours. About half of the respondents were exposed to noise for 7-8 hours and about 1/4th of respondents were exposed about 8 hours.

TABLE 3: Mean health effects of noise pollution of total sampling stations

PROBLEM	NO. OF RESPONDENTS	PERCENTAGE
Sleeplessness	30	25
Hearing problem	24	20
Headache	30	25
Bad temper	20	17
High blood pressure	10	8
Heart problem	6	5
Total	120	100

This survey shows that large numbers of respondents were suffering from various psychological problems. About 25% of respondents were suffering from sleeplessness, 20% were facing hearing issue, 25% had got temper problem, 17% got the problem of headache, 8% got the problem of high blood pressure and 3% got the problem of heart related issues. Heart issues were mainly seen among higher age group.

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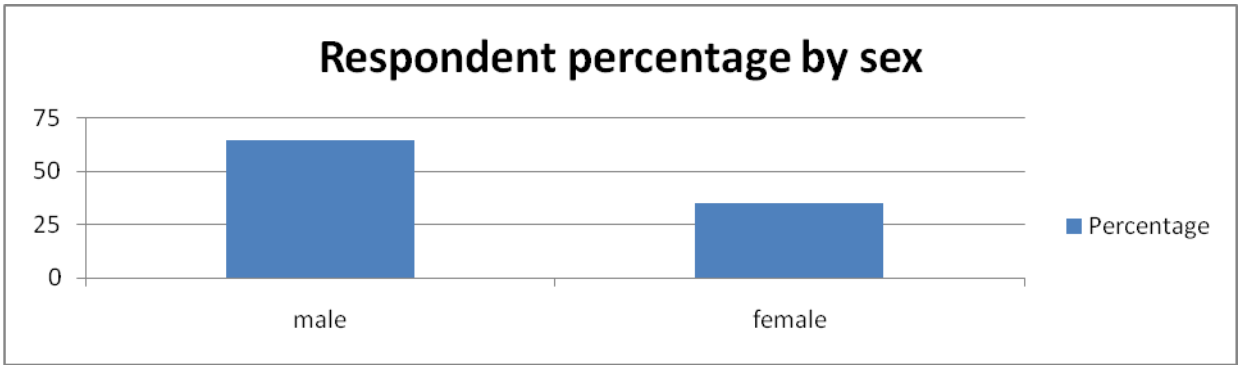

Fig. 3: Respondent percentage by sex.

Among the respondents 65% were male and 35% were female (mostly male were interviewed because they were easy to get the response).

Most of the respondents were of young age which was about 40% within 21 to 30 years of age, 20% were from age group below 20, 15 % were from age group of 31 to 40 years and 5% were from age group of more than 60. This representation is shown below.

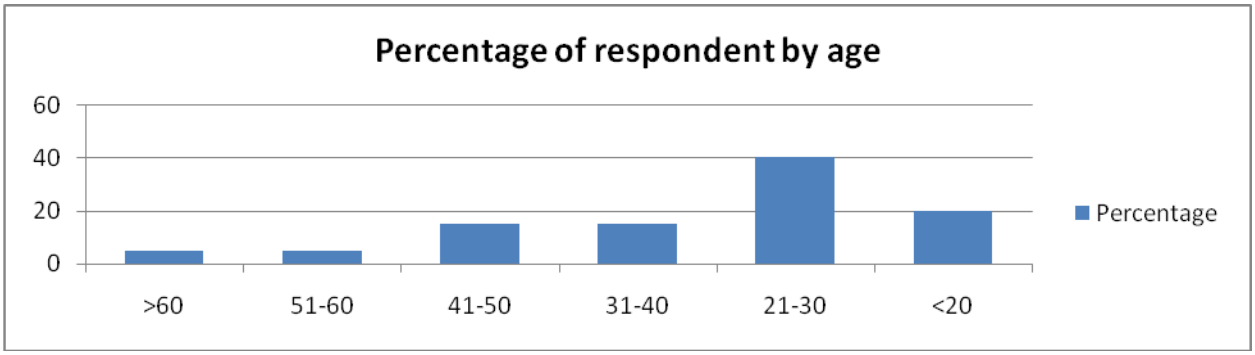

Fig. 4: Percentage of respondent by age.

Almost all the respondents responded that noise was the issue for their health and daily life performances, 15% responded that noise pollution was bearable, 80% responded that noise was not bearable and 5% responded that noise pollution is not the problem.

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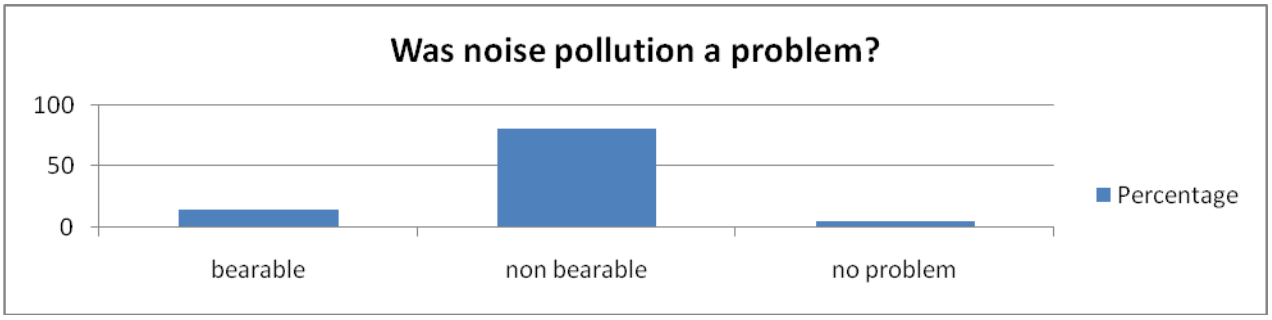

Fig. 5: Was noise pollution a problem?

PROBLEMS SUFFERED FROM NOISE POLLUTION ARE SHOWN GRAPHICALLY BELOW.

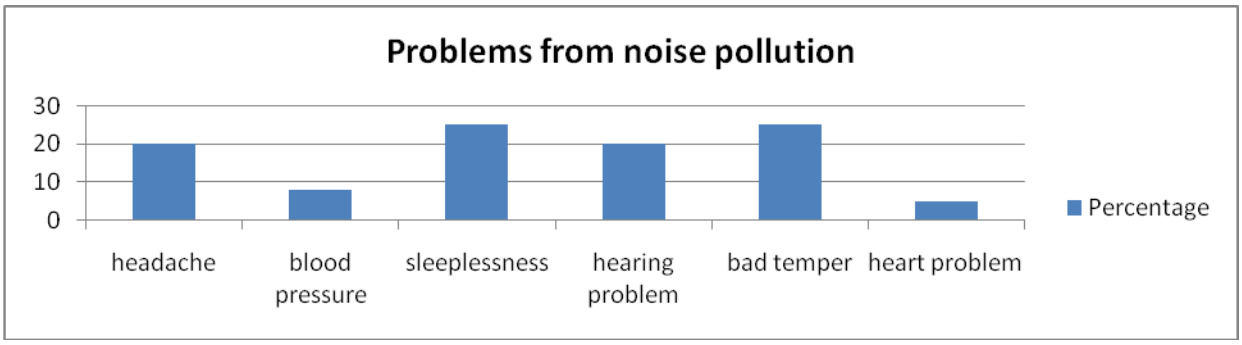

Fig. 6: Problems from noise pollution.

In Deoria city noise pollution is a severe problem. People are suffering from various health issues mainly sleeplessness, hearing problem, headache, heart problem and bad temper. For hearing problem 25% visited the hospitals, for sleeplessness 20% have visited the hospitals, 5% have visited the hospitals who were suffering from heart problems, 5% have visited the hospitals for headache and 45% have not visited the hospitals for their problems despite of their problems.

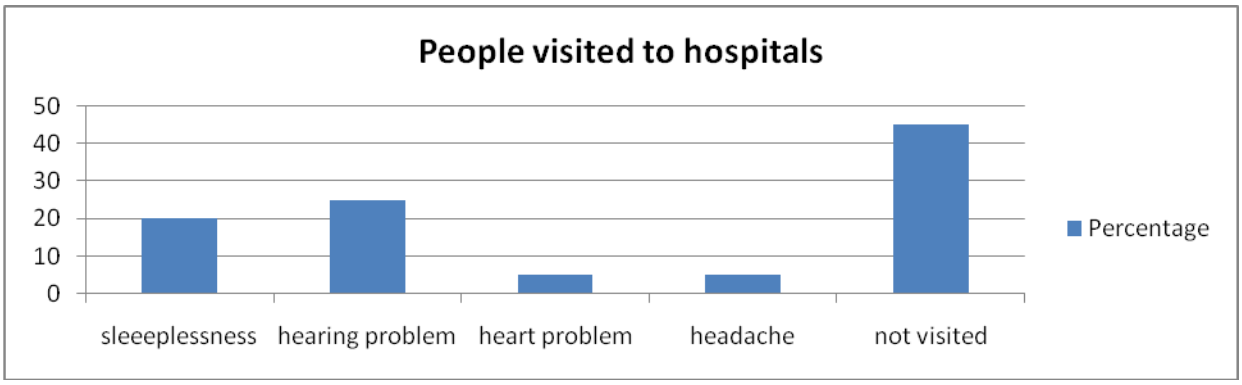

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Fig. 7: People visited to hospitals.

B. EFFECT OF NOISE POLLUTION ON DIFFERENT AGE GROUP IN DEORIA CITY:-

TABLE 4: Effects of noise on different age group (%)

Age group (year)	Sleeplessness	Headache	Hearing problem	Bad temper	Blood pressure	Heart problem
<20	42	45	40	35	0	0
21-30	45	58	45	38	0	0
31-40	35	60	45	42	15	5
41-50	75	60	65	45	35	2
51-60	65	90	65	40	42	44.5
>60	70	95	70	55	58	45

The above table shows the percent of respondents exposed to noise pollution caused mainly by traffic noise and causing various health problems to the people of Deoria city. This research shows that people were more effected who were doing jobs in commercial and industrial areas. Various age groups were affected differently.

The above table is prepared on the basis of the information gathered from the survey conducted. All the people were divided into different age groups depending upon the age groups who are meant to be exposed to the noise pollution for long duration. It is found that heart problems were mainly seen in the people of age group of more than 60, headache, sleeplessness, and hearing problems were mainly seen in the working age groups.

C. EFFECTS OF NOISE POLLUTION FOR PEOPLE WORKING IN THE INDUSTRIES

During the research survey 50 workers were asked various questions related to noise pollution among them all were male. Most of them were within the age group of 20-40. Rest of them was above the age of 40. Most of the workers surveyed were uneducated who were involved in manual work. 60% of them were uneducated and 40% of them were educated.

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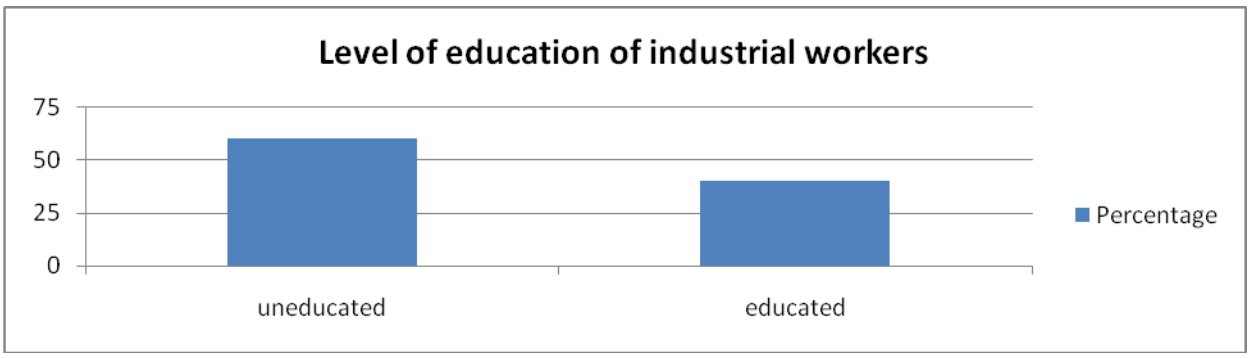

Fig. 8: Level of education of industrial workers.

Most of the workers were involved in food processing industries and some of them are involved in steel products and automobile centers.

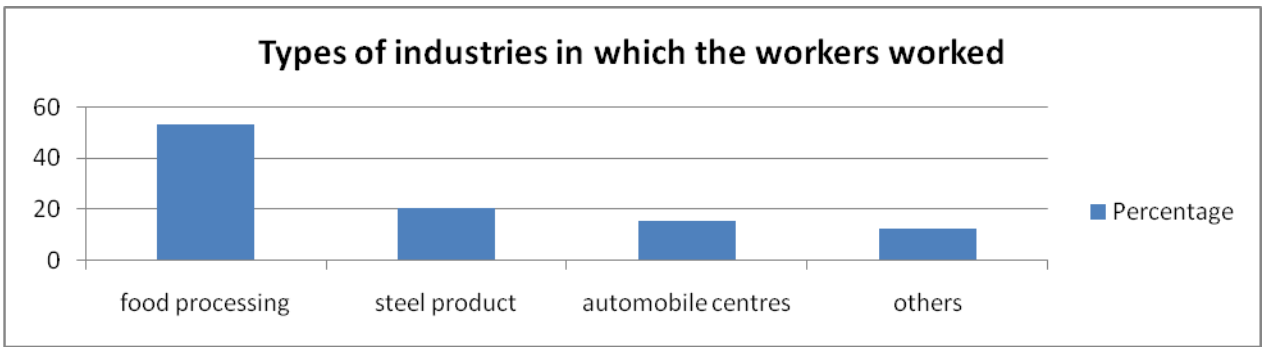

Fig. 9: Types of industries in which the workers worked.

Survey was conducted on various questions the major question was, is noise pollution a problem in their health and professional performance? 60% of workers out of 50, replied yes it is a problem which caused them various issues mainly sleeplessness and hearing problem and 40% of the workers replied no it is not a problem and they are used to it.

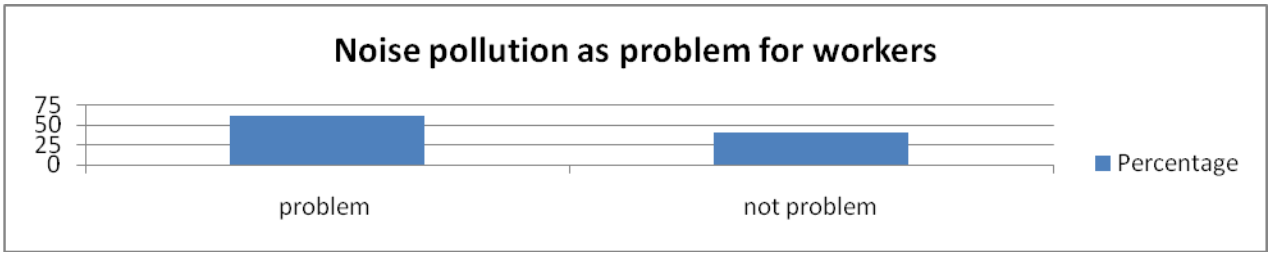

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Fig. 10: Noise pollution as problem for workers.

Majority of the workers accepted that noise pollution was a problem and out of them 80% were suffering from headache, 10% from sleeplessness and rest were suffering from other problems.

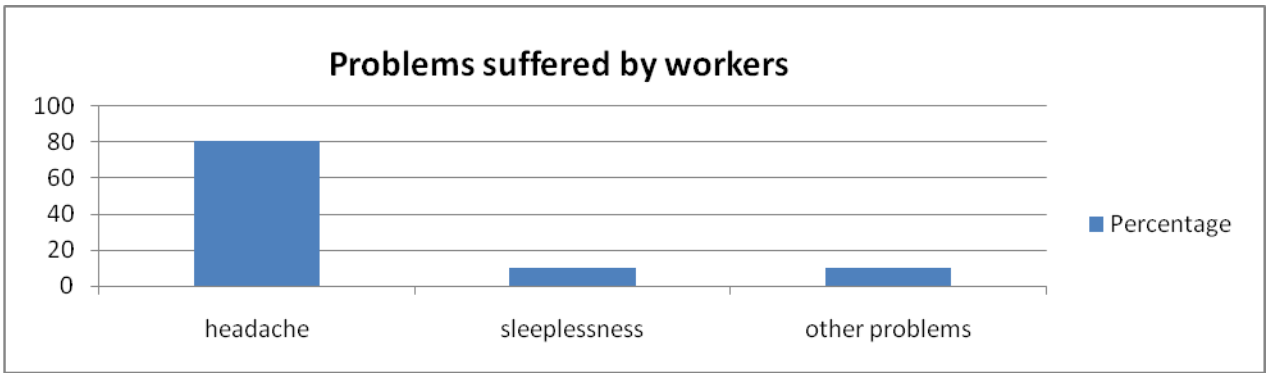

Fig. 11: Problems suffered by workers.

IV. CONCLUSIONS

The review uncovers the current traffic noise pollution status of Deoria city. The noise limits set by Central Pollution Control Board (CPCB), India surpasses in most of the sampling stations. The greatest noise level being at around 100 dB(A), shows the hazardous level of noise in Deoria city. Most extreme condition of noise level was at the bus stand, which suggests that controlling measures are needed urgently at this location. Noise pollution is a serious and neglected issue not only in Deoria city but also throughout densely populated citied of India. It is time for NGOs, the media, and the Government of India to work together to reduce the problem, and improve the quality of life in this country. As many of the sources of noise pollution are unnecessary and could be reduced easily and at little cost, there is no excuse for further delaying on action. Given the magnitude of the problem, and of the human suffering that results, we can no longer afford to neglect the issue of noise pollution. For the health, sanity, and well-being of the population, and for the future of our children, it is time that we all take this problem seriously, and begin implementing solutions. Whether as individuals, NGO staff, or members of the media, we can and must take specific steps to reduce the problem of noise pollution.

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